6.15 HAZARDOUS MATERIALS HANDLING

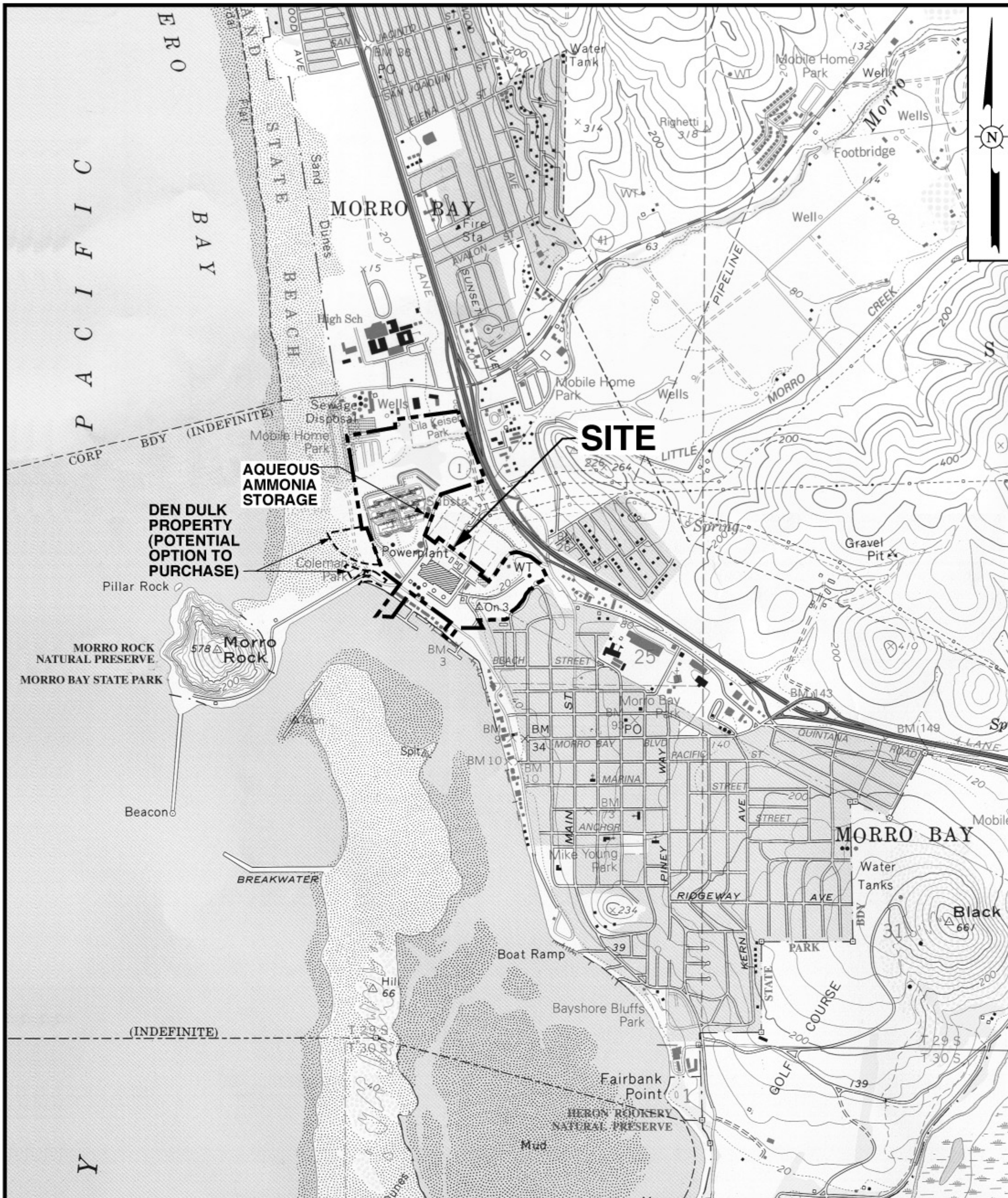
This section discusses the hazardous materials currently used at the Morro Bay Power Plant (MBPP), and others that will be used for the Project. The use of combined-cycle units has the benefit of minimizing the use of hazardous materials. Design features have been incorporated into the Project regarding the use of hazardous materials, especially their storage, to keep maximum potential impacts below defined thresholds of significance. Hazardous wastes are discussed in Section 6.14 - Waste Management. The distinction is that a hazardous material arrives onsite, is used and may turn into a hazardous waste requiring disposal. An application of this distinction is the use of asbestos-containing materials in the existing stacks and lubricants in existing generators. When the Project demolishes the stacks and sells the generators, the hazardous materials are treated as hazardous wastes. As such, the management of these hazardous wastes is discussed in Section 6.14 - Waste Management. Similarly, the fuel oil at the bottom of the offsite tanks becomes hazardous waste, and the steel in the tanks becomes nonhazardous solid waste, both of which are considered in the cumulative analysis portion of Section 6.14 for this separate project.

Beneficial design features of the Project that keep potential impacts below a level of significance include the following:

- Choice of aqueous, rather than anhydrous, form of ammonia to reduce consequences if there were an accidental release.
- Central location of the aqueous ammonia storage facility on the MBPP site to keep it as far away as possible from surrounding residential areas (see Figure 6.15-1).
- Passive secondary containment structures that surround each aqueous ammonia storage tank and the tank truck unloading facility, limiting the area of potential spread of an accidental release.
- Underground containment (tertiary) vault that would collect an accidental release, reducing its ability to vaporize into the atmosphere.
- Large 24-inch (manhole-size) drain at the bottom center of the sloped secondary containment beneath each storage tank, combined with direct entry into the vault to reduce the time available for ammonia to volatilize from an exposed pool of liquid.
- Use of plastic balls to reduce ammonia evaporation from an exposed liquid surface, or out of the underground containment vault.

The Project will have a specially-designed unloading and storage facility that will minimize any chance of aqueous ammonia reaching the environment around the plant, including nearby residences. The tank truck unloading facility and storage tanks will be surrounded by a concrete-walled basin (secondary containment) below which will be an underground vault (tertiary containment).

98-710RAFC-61 REV.10/13/00



0 2,000 4,000 FEET

SCALE: 1: 24,000

REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP OF MORRO BAY NORTH AND MORRO BAY SOUTH, CALIFORNIA, DATED 1993 AND 1994.

LOCATION MAP
AQUEOUS AMMONIA STORAGE

DUKE ENERGY MORRO BAY LLC
MORRO BAY POWER PLANT

TRC

FIGURE 6.15-1

Several programs at MBPP already address hazardous materials storage locations, emergency response procedures, employee training requirements, hazard recognition, fire control procedures, hazard communications training, personal protection equipment training, and release reporting requirements. The existing program of employee training for safe handling of hazardous materials includes both initial and refresher training to assure that appropriate personnel are kept up to date on coordination with response agencies, proper use of onsite emergency response equipment, and hazardous materials information in the Business Plan/Contingency Plan (TRC, 1998b), Spill Prevention Control and Countermeasures Plan (TRC, 1998a), and Stormwater Pollution Prevention Plan (ESE, 1996). Volume II of the Business Plan/Contingency Plan is the Facility Emergency Response Plan (Duke Engineering, 2000) that contains detailed instructions for plant personnel to follow in the event of a hazardous material release, fire, flood, earthquake or explosion. The information includes maps, diagrams, contacts, teams, first aid, and a description of the Incident Command System.

Section 112(r) of the Clean Air Act established the federal program to manage the risks of hazardous materials and the potential offsite consequences of an accidental release. The California Office of Emergency Services established the California Accidental Release Prevention (Cal-ARP) Program to carry out the federal requirements. The Cal-ARP Program specifies those hazardous materials and quantities that require preparation of a Risk Management Plan (RMP) and analysis of offsite consequences.

The Cal-ARP Program defines three program levels with different levels of requirements depending upon the accident history and potential impact of releases of regulated substances. The Program requires that the owner or operator coordinate closely with the Administering Agency (AA) to determine the appropriate level of documentation required for an RMP. At a minimum, the RMP includes one worst-case release scenario and offsite consequence analysis for each process utilizing a Regulated Substance, a 5-year accident history for the process, assurance that response actions have been coordinated with local emergency planning and response agencies, and a certification that no additional measures are necessary to prevent offsite impacts from accidental releases.

Aqueous ammonia is the only hazardous material associated with the Project that will be present in sufficient quantity to require offsite consequence analysis for a hypothetical worst-case accidental release. Specific engineering design features have been included in the Project to keep public health impacts from reaching the nearest residence, sensitive receptors, or other offsite receptors, and hence, keep impacts below a level of significance. Therefore, the MBPP qualifies for Program 1 designation under Cal-ARP. Under Program 1, an RMP will be developed and approved prior to the arrival of aqueous ammonia that will be used in the Project. This RMP will include the following minimum requirements:

- Description of the worst-case release scenario and offsite consequence analysis.
- Document that the nearest public receptor(1) is beyond the distance to the toxic endpoint for aqueous ammonia.
- Document that during the past 5 years the processes using aqueous ammonia have had no accidental release that caused offsite impacts.(2)
- Assurance that response actions have been coordinated with local emergency planning and response agencies.
- Certify that "no additional measures are necessary to prevent offsite impacts from accidental releases."

Two identical tanks will store the aqueous ammonia to be used for the new combined-cycle units. The aqueous ammonia will be delivered by truck and unloaded by a specially designed facility.

Twelve sensitive receptors, including schools, day-care facilities and long-term health care facilities are located within approximately 3 miles of the site (see Figure 6.15-2 and Table 6.15-1). These sensitive receptors are also public receptors as defined above. The County Hospital is located approximately 13 miles from MBPP. The nearest public receptors are situated in the harbor area across Embarcadero west of the site, in the mobile homes and RVs north of Willow Camp Creek on Duke Energy property, and in the homes on the east side of Dune Street, east of the Project. The nearest residence is approximately 1,210 feet northwest of the aqueous ammonia storage tanks.

6.15.1 EXISTING CONDITIONS

The MBPP is located in the city of Morro Bay, 12 miles northwest of San Luis Obispo, California in San Luis Obispo County. The plant is situated west of Highway 1, near to Morro Bay Harbor and east of Estero Bay (see Figure 6.15-1). The area includes light industry, commercial operations, and marine, residential and recreational uses.

---

(1) A public receptor is defined as "...offsite residences, institutions (e.g., schools, hospitals), industrial, commercial, and office buildings, … parks, or recreational areas inhabited or occupied by the public at any time without restriction by the stationary source where members of the public could be exposed to toxic concentrations, radiant heat, or overpressure, as a result of an accidental release."

(2) Offsite impacts for the purpose of the 5-year accidental release history include death, injury, or response or restoration activities for an exposure of an environmental receptor (Section 2735.4 of Title 19, Division 2, Chapter 4.5, California Code of Regulations).

TABLE 6.15-1

OFFSITE SENSITIVE RECEPTORS AND THEIR COORDINATES[1] MORRO BAY POWER PLANT

NO.	RECEPTOR/TYPE	UTM (E)[2] (Meters)	UTM (N)[3] (Meters)	DISTANCE FROM AQUEOUS AMMONIA STORAGE (feet)
1	Day Care Center, 447 Hillview	694,845	3,917,877	3,800
2	Morro Bay High School, 235 Atascadero	694,577	3,917,515	2,600
3	Morro Elementary School, 1130 Napa	695,470	3,916,143	3,200
4	Preschool/Day Care Center, 685 Monterey	695,409	3,915,607	4,400
5	Retirement Home, 1405 Teresa	697,697	3,915,716	10,400
6	Estero Bay Day School, 853 Quintana	696,140	3,915,877	5,500
7	Adult Day Health Care, 1475 Quintana	697,594	3,915,523	10,300
8	Del Mar Elementary School, 501 Sequoia	694,445	3,919,190	8,100
9	Retirement Home, 2910 Cedar	694,455	3,918,893	7,100
10	Montessori School, 600 Quintana	695,887	3,916,098	4,500
11	Retirement Home, 537-A Piney Way	695,748	3,915,394	5,600
12	Social Service Facility, 445 Chorro Creek	698,774	3,915,260	14,300

98-710/Rpts/AFC(text) (10/10/00/rm)

(1) These sensitive receptors are also public receptors as defined on page 6.15-2.
(2) UTM (E) = Universal Transverse Mercator, east.
(3) UTM (N) = Universal Transverse Mercator, north.
(4) Distance between center of receptor property and center of 60 feet by 60 feet secondary containment basin of aqueous ammonia storage facility rounded to the nearest hundred feet.

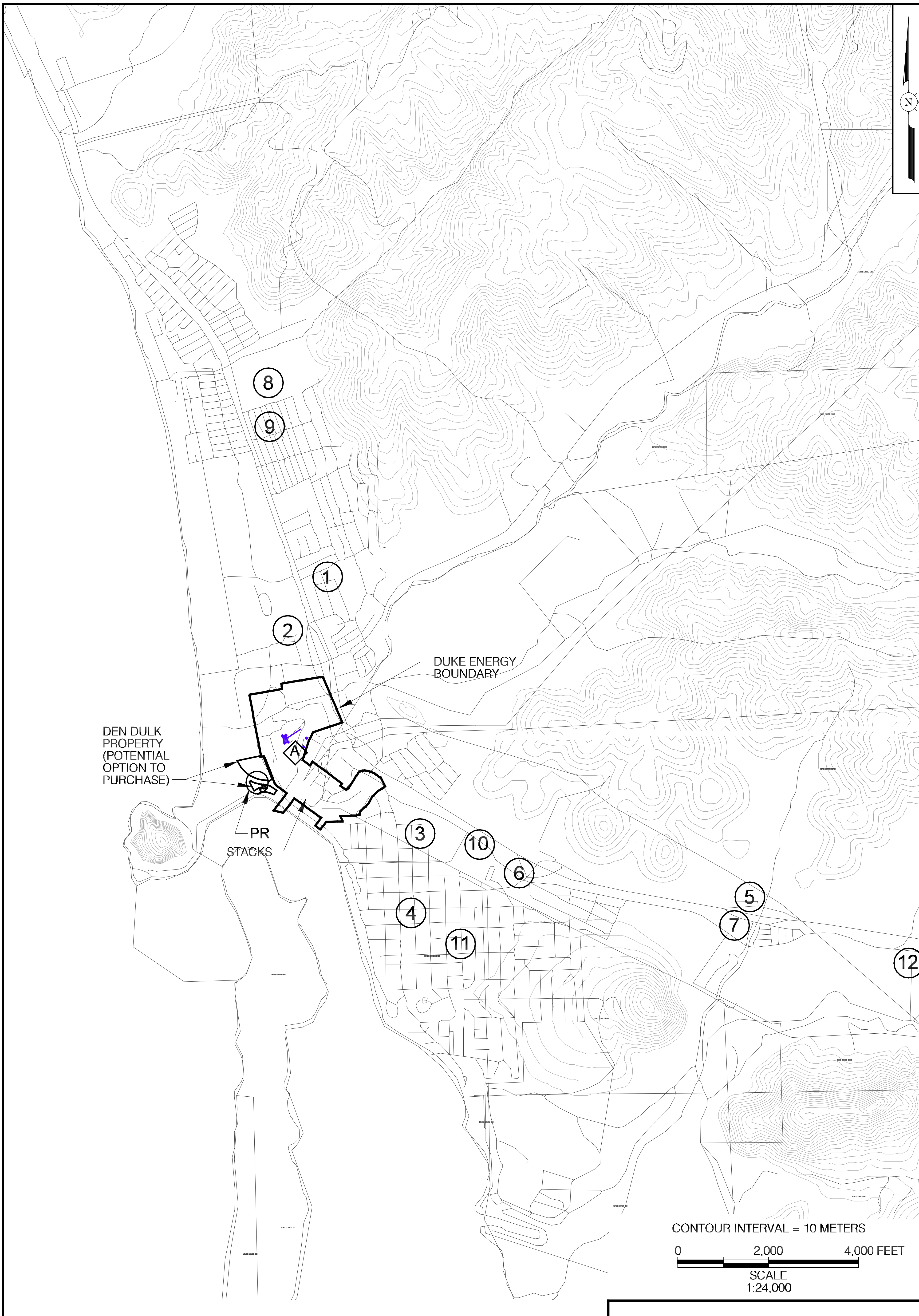
Facility maintenance and service personnel at MBPP are trained in proper handling of hazardous materials and use of emergency response equipment. Typical methods used, in order of preference, to avoid or minimize impacts from the accidental releases of hazardous materials are as follows:

- Use of nonhazardous or less hazardous materials.
- Use of engineered controls.
- Use of administrative controls.
- Emergency response planning.

Hazardous materials currently used or stored at MBPP for ongoing operations include, petroleum products, flammable and/or compressed gases, scale inhibitors, oxygen scavengers, neutralizers, chlorinators, settling aids, and minor amounts of solvents and paints. An inventory of hazardous materials stored or handled at MBPP is presented in the Business Plan/Contingency Plan (TRC, 1998a) submitted by Duke Energy in accordance with California Code of Regulations (CCR) Title 19, Division 2, Chapter 4, Article 4 requirements, and is incorporated herein by reference. Table 6.15-2 lists existing hazardous materials in alphabetical order, along with the use, location and nature of the hazard of each.

The quantity of each hazardous material in Table 6.15-2 that is evaluated for possible risk management regulation is the maximum quantity associated with a specific process, not the total onsite. A process can be the storage, handling, or use in a specific piece of equipment (e.g., electrical generator, air pollution control device). Even in storage, containers that are spaced sufficiently distant to prevent interaction with each other are considered separate processes. The maximum process-related quantity of each hazardous material is listed in Table 6.15-2, along with the threshold quantities that determine if an RMP is needed under the Cal-ARP or federal programs. Each existing hazardous material in Table 6.15-2 was evaluated and found to be lower than Cal-ARP thresholds, and hence, not requiring an RMP.

Without the Project, existing Units 1 through 4 would require increased control of nitrogen oxides (NO_x) emissions to comply with San Luis Obispo County Air Pollution Control District (APCD) rules. Most likely, increased NO_x control would be accomplished through use of SCR. Aqueous ammonia would be needed for the SCR, and hence, it would be transported to and stored at the plant within approximately 2 to 3 years. The amount of aqueous ammonia needed for Units 1 through 4 would be sufficiently large to justify at least one storage tank of the same size planned for the Project (i.e., 30,000-gallon administrative limit in a 34,050-gallon tank). Even one such storage tank would require a RMP, as discussed herein.



NOTES
1. ELEVATION CONTOURS SHOWN ABOVE STACK HEIGHT.
2. (1) ARE SENSITIVE RECEPTORS LISTED IN TABLE 6.15-1, WHICH ARE ALSO PUBLIC RECEPTORS AS DEFINED ON PAGE 6.15-2.
3. (PR) A PUBLIC RECEPTOR.
4. (A) AQUEOUS AMMONIA STORAGE FACILITY.

OFFSITE SENSITIVE RECEPTORS

DUKE ENERGY MORRO BAY LLC
MORRO BAY POWER PLANT

TRC

FIGURE 6.15-2

TABLE 6.15-2

EXISTING HAZARDOUS MATERIALS
MORRO BAY POWER PLANT

MATERIAL	USE	LOCATION	NATURE OF HAZARD	PROCESS-RELATED MAXIMUM QUANTITY (pounds)	RMP THRESHOLD[1] (pounds)	
					Cal-ARP	Federal
Acetylene	Welding	Compressed Gas Storage South of Warehouse	Flammable	25	--	10,000
Diesel Fuel	Vehicles and Diesel Emergency Fire Pumps and Safe Plant Shutdown Generator	Outside Southeast Corner of Power Building	Flammable	28,162	--	--
Gasoline	Fueling Vehicles	Northeast of Power Building	Flammable	5,741	--	--
Hydrazine (35% by weight)	Feedwater Oxygen Control	Hydrazine Storage Building	Toxic	347	1,000	15,000
Hydrogen	Generator Cooling	Units 1 through 4 Generators	Flammable	744[3]	--	10,000
Light Petroleum Distillates	Solvent for Cleaning	Lube Oil Storage Building	Flammable	312	--	--
Propane	Forklift Fuel	Compressed Gas Storage South of Warehouse	Flammable/Toxic	49	--	10,000
Sodium Hydroxide (various % wt)	pH Adjustment	Warehouse Hazardous Materials Building	Corrosive	488	--	--
Sodium Hypochlorite (12.5% wt)	Circulating Water Biofouling Control	Cooling Water Intake Structure	Corrosive	5,372	--	--

98-710/Rpts/AFC(text) (10/13/00/jkh

(1) Threshold above which a Risk Management Plan (RMP) is required.
(2) Conservatively based on the total amount of hydrogen delivered by, and stored in, a ton-tube trailer.

A separate inventory of just the petroleum-containing hazardous materials with potential for spill is presented in the Spill Prevention Control and Countermeasure Plan, Attachment C, prepared for MBPP in accordance with Title 40, Code of Federal Regulations (CFR) Part 112.7, and is replicated herein as Tables 6.15-3 (onsite) and 6.15-4 (offsite). This inventory includes detailed information on type of container, type of fluid, location, purpose, major cause of potential spills, potential volume of spill, and direction of spill flow.

Emergency response policies and procedures outlined in the Business Plan/Contingency Plan describe the necessary actions to be taken by facility personnel in the event of a hazardous material release to the air, soil or surface water in the plant vicinity. These procedures include a notification checklist, which gives contact information for personnel, emergency response agencies, regulatory agencies, neighboring property owners, hospitals and ambulance services.

Section 6.17 - Worker Safety discusses how training minimizes hazardous materials handling problems, and hence, potential adverse impacts on plant personnel, as well as to the public.

6.15.2 IMPACTS

Significance criteria were determined on the basis of the California Environmental Quality Act (CEQA) Guidelines, Appendix G, Environmental Checklist Form (Approved January 1, 1999) and on performance standards and thresholds adopted by responsible agencies. An impact may be considered significant if the Project:

- Creates a significant hazard to the public or the environment through the routine transport, use or disposal of a hazardous material.
- Creates a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of a hazardous material into the environment.
- Emits hazardous emissions or involves handling a hazardous material, substance or waste within 1/4 mile of an existing or proposed school.
- Is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, creates a significant hazard to the public or the environment.
- Impairs implementation of or physically interferes with an adopted emergency response plan or emergency evacuation plan.

TABLE 6.15-3

INVENTORY AND SPILL PREDICTION DATA
MORRO BAY POWER PLANT

TYPE OF CONTAINER	NUMBER OF ITEMS	VOLUME PER CONTAINER (gallons)	TOTAL VOLUME (gallons)	TYPE OF FLUID	LOCATION[(1)]	PURPOSE	MAJOR CAUSE OF SPILL OR FAILURE	AMOUNT OF SPILL (gallons)	DIRECTION OF FLOW
A. OPERATING SYSTEMS AND EQUIPMENT									
Lubricating Oil Systems (Unit 1, 2)	2	5,500	11,000	Lubricating Oil	C5	Bearing Lubrication Operating Units	Line Leak/Rupture System Failure	0 - 500	To Building Sump
Lubricating Oil Systems (Units 3, 4)	2	8,100	16,200	Lubricating Oil	C5	Bearing Lubrication Operating Units	Line Leak/Rupture System Failure	0 - 500	To Building Sump
Lubricating Oil Storage Tanks (Units 1, 2)	2	7,500	15,000	Lubricating Oil	C5	Lubricating Oil Storage	Line Leak/Rupture System Failure	0 - 500	To Building Sump
Lubricating Oil Storage Tanks (Units 3, 4)	2	9,400	18,800	Lubricating Oil	C6	Lubricating Oil Storage	Line Leak/Rupture System Failure	0 - 500	To Building Sump
Hydrogen Seal Reservoirs	6	100	600	Lubricating Oil	C5	Lubricating Oil Storage	Piping Leaks	0 - 10	To Building Sump
B. OPERATING ELECTRICAL EQUIPMENT - POWER PLANT									
Main Transformers - Bank 1	3	7,700	23,100	Mineral Oil	C4	Operating Electrical Equipment	Casing Rupture	0 - 7,700	Within Berm
No. 1 House Transformer	1	2,872	2,872	Mineral Oil	C4	Operating Electrical Equipment	Casing Rupture	0 - 2,872	Within Berm
Main Transformers - Bank 2	3	7,700	23,100	Mineral Oil	C4 - C5	Operating Electrical Equipment	Casing Rupture	0 - 7,700	Within Berm
No. 2 House Transformer	1	2,872	2,872	Mineral Oil	C4 - C5	Operating Electrical Equipment	Casing Rupture	0 - 2,872	Within Berm
Spare Transformer	1	7,700	7,700	Mineral Oil	C5	Operating Electrical Equipment	Casing Rupture	0 - 7,700	Within Berm
House Transformers - Bank 3	2	1,588	3,176	Mineral Oil	C5	Operating Electrical Equipment	Casing Rupture	0 - 1,588	Within Berm
IP & HP Transformers - Bank 3	2	13,660	27,320	Mineral Oil	C5	Operating Electrical Equipment	Casing Rupture	0 - 13,660	Within Berm
House Transformers - Bank 4	2	1,588	3,176	Mineral Oil	C5	Operating Electrical Equipment	Casing Rupture	0 - 1,588	Within Berm

(1) Location is keyed to grid indicated on Facility Layout/Drainage Map (Attachment 2). For example, Location "F2" refers to the grid location defined by row F, column 2.

TABLE 6.15-3

INVENTORY AND SPILL PREDICTION DATA
MORRO BAY POWER PLANT
(Continued)

TYPE OF CONTAINER	NUMBER OF ITEMS	VOLUME PER CONTAINER (gallons)	TOTAL VOLUME (gallons)	TYPE OF FLUID	LOCATION(1)	PURPOSE	MAJOR CAUSE OF SPILL OR FAILURE	AMOUNT OF SPILL (gallons)	DIRECTION OF FLOW
B. OPERATING ELECTRICAL EQUIPMENT - POWER PLANT (Cont'd)									
IP & HP Transformers - Bank 4	2	8,300	16,600	Mineral Oil	C5	Operating Electrical Equipment	Casing Rupture	0 - 8,300	Within Berm
Transformers No. 8, 9	2	7,788	15,576	Mineral Oil	C6	Operating Electrical Equipment	Casing Rupture	0 - 7,788	To Spill Basin No. 2 via Drainage Ditch
Oil Circuit Breakers No. 442	1	1,420	4,260	Mineral Oil	C5	Operating Electrical Equipment	Casing Rupture	0 - 1,420	To Spill Basin No. 2 via Drainage Ditch
Oil Circuit Breakers No. 432	1	2,535	7,605	Mineral Oil	C5	Operating Electrical Equipment	Casing Rupture	0 - 2,535	To Spill Basin No. 2 via Drainage Ditch
Oil Circuit Breakers No. 422	1	1,420	4,260	Mineral Oil	C4	Operating Electrical Equipment	Casing Rupture	0 - 1,420	To Spill Basin No. 2 via Drainage Ditch
Oil Circuit Breakers No. 412	1	1,400	4,200	Mineral Oil	C4	Operating Electrical Equipment	Casing Rupture	0 - 1,400	To Spill Basin No. 2 via Drainage Ditch
Load Center 16 Transformer	1	450	450	Mineral Oil	C6	Operating Electrical Equipment	Casing Rupture	0 - 450	Within Berm (Rock Blotter)
Sandblast Transformer	1	450	450	Mineral Oil	D7	Operating Electrical Equipment	Casing Rupture	0 - 450	Within Berm
C. ABOVEGROUND FUEL TANKS(2)									
Fuel Oil Storage Tank 1	1	6.52 million	6.52 million	Fuel Oil	C2	Interim Oil Storage	No Spill Potential	0	No Spill Potential
Fuel Oil Storage Tank 2	1	6.40 million	6.40 million	Fuel Oil	C2 - C3	Interim Oil Storage	No Spill Potential	0	No Spill Potential

(1) Location is keyed to grid indicated on Facility Layout/Drainage Map (Attachment 2). For example, Location "F2" refers to the grid location defined by row F, column 2.
(2) The Morro Bay Power Plant currently uses natural gas to fire the boilers. Fuel storage tanks 1-5 and the fuel oil additive day tank have had all pumpable product removed. As such, there is essentially no spill potential for these tanks.

TABLE 6.15-3

INVENTORY AND SPILL PREDICTION DATA
MORRO BAY POWER PLANT
(Continued)

TYPE OF CONTAINER	NUMBER OF ITEMS	VOLUME PER CONTAINER (gallons)	TOTAL VOLUME (gallons)	TYPE OF FLUID	LOCATION[1]	PURPOSE	MAJOR CAUSE OF SPILL OR FAILURE	AMOUNT OF SPILL (gallons)	DIRECTION OF FLOW
C. ABOVEGROUND FUEL TANKS[2] (Cont'd)									
Fuel Oil Storage Tank 3	1	6.47 million	6.47 million	Fuel Oil	C1 - C2	Interim Oil Storage	No Spill Potential	0	No Spill Potential
Fuel Oil Storage Tank 4	1	6.44 million	6.44 million	Fuel Oil	C2 - D2	Interim Oil Storage	No Spill Potential	0	No Spill Potential
Fuel Oil Storage Tank 5	1	6.54 million	6.54 million	Fuel Oil	D2	Interim Oil Storage	No Spill Potential	0	No Spill Potential
Fuel Oil Storage Additive Day Tank	1	9,000	9,000	Petroleum-Based Additive	B6	Injected Into Fuel Oil Before Burning	No Spill Potential	0	No Spill Potential
Displacement Oil Tank No. 1	1	2.14 million	2.14 million	Diesel Fuel and Water	D3	Displacement Oil	Filling or Rupture	0 - 2.14 million	Within Berm
Vehicle Fuel Tanks	2	1,000	2,000	Diesel/ Gasoline	D7	Fuel Plant Vehicles	Filling, Drainage or Transfer	0 - 5	Containment Tank
No. 2 Fire Pump Tank (Fire House #1)	1	500	500	Diesel Fuel	B4	Fuel Fire Pump	Filling, Drainage or Transfer	0 - 500	Within Berm
Nos. 3 & 4 Fire Pump Tanks (Fire House #2)	2	450	900	Diesel Fuel	C4	Fuel Fire Pumps	Filling, Drainage or Transfer	0 - 450	Within Berm
Diesel Fuel Tank (Emergency Generator)	1	500	500	Diesel Fuel	C5	Power Emergency Generator	Filling, Drainage or Transfer	0 - 500	Containment Tank
D. OILY WATER SEPARATOR FACILITY									
Oily Water Surge Tanks	2	9,300	18,600	Oily Water	B3	Process Wastewater-Plant Operations	Filling/Draining	0 - 9,300	Within Berm/ Return to Tank
Oily Water Surge Tank - New	1	8,000	8,000	Oily Water	B3	Process Wastewater-Plant Operations	Filling/Draining	0 - 8,000	Within Berm/ Return to Tank
Waste Oil/Sludge Tank	1	1,000	1,000	Waste Oil/Sludge	B3	Waste Oil/Sludge Collection	Piping Leaks	0 - 1,000	Containment Berm

98-710/Rpts/AFC(text) (9/27/00/jb)

(1) Location is keyed to grid indicated on Facility Layout/Drainage Map (Attachment 2). For example, Location "F2" refers to the grid location defined by row F, column 2.

(2) The Morro Bay Power Plant currently uses natural gas to fire the boilers. Fuel storage tanks 1-5 and the fuel oil additive day tank have had all pumpable product removed. As such, there is essentially no spill potential for these tanks.

TABLE 6.15-4

INVENTORY AND SPILL PREDICTION DATA
MORRO BAY POWER PLANT
OFFSITE OIL STORAGE FACILITY[1,2]

TYPE OF CONTAINER	NUMBER OF ITEMS	VOLUME PER CONTAINER (gallons)	TOTAL VOLUME (gallons)	TYPE OF FLUID	PURPOSE	MAJOR CAUSE OF SPILL OR FAILURE	AMOUNT OF SPILL (gallons)	DIRECTION OF FLOW
A. ABOVEGROUND FUEL TANKS								
Fuel Oil Storage Tank No. 6	1	20.4 million	20.4 million	Fuel Oil	Boiler Fuel	No Spill Potential	0	No Spill Potential
Fuel Oil Storage Tank No. 7	1	20.5 million	20.5 million	Fuel Oil	Boiler Fuel	No Spill Potential	0	No Spill Potential
Displacement Oil Storage Tank No. 2	1	1.6 million	1.6 million	Diesel	Displacement Oil	No Spill Potential	0	No Spill Potential
Boiler Day Tank	1	21,210	21,210	Diesel	Boiler Fuel	No Spill Potential	0	No Spill Potential
Fire Pump Diesel Fuel Tank	2	565	1,130	Diesel	Engine Fuel	No Spill Potential	0	No Spill Potential
B. OPERATING SYSTEMS AND EQUIPMENT								
Electrical Transformer	1	359	359	Mineral Oil	Electrical Equipment Operation	Casing Rupture	0-359	Containment in Immediate Area

98-710/Rpts/AFC(text) (9/27/00/jb)

(1) This table is the same as Attachment C in TRC (1998b).

(2) The Morro Bay Power Plant is fueled by natural gas. Aboveground fuel tanks located in the Offsite Oil Storage Facility previously used to supply fuel for the boilers at the plant have therefore been emptied of all pumpable material.

Aqueous ammonia and other hazardous materials will be transported to the MBPPP by specialized vendors. Such transport is interstate commerce, and as such, is not the responsibility of an individual customer (e.g., Duke Energy). The following discussion is intended to describe the potential environmental impacts of such transport, which is regulated by the U.S. and California Departments of Transportation.

Ammonia will be used in Selective Catalytic Reduction (SCR) of nitrogen oxides produced by combustion of natural gas. The more environmentally benign form of ammonia, aqueous ammonia, will be used to avoid the difficult storage and handling requirements of anhydrous ammonia, which is the pressurized gaseous form. Aqueous ammonia is the most common commercially grade used extensively as fertilizer in agriculture. Agriculture in California used an average of 151,710 tons of aqueous ammonia per year during 1995-1999(3).The combined-cycle gas turbines proposed for the MBPPP will use approximately 2,564 tons of aqueous ammonia per year, requiring delivery of 8,000 gallons in a tank truck approximately once every 4 days. This use rate would be approximately 1.7 percent of the total used by the Project and agriculture in California.

Tank truck transport of aqueous ammonia for agriculture and other industry throughout California has had no incidents reported to the U.S. Department of Transportation for the period 1993-1999.(4) The only incidents involving aqueous ammonia occurred with cargo and van hauling of small containers, for which the largest spill was 500 gallons. The Project will only utilize tank truck transport because these vehicles are specifically designed to transport aqueous ammonia and other hazardous liquids safely. The excellent safety record for the tank truck transport of aqueous ammonia indicates that the probability is negligible for an incident in which aqueous ammonia might be spilled from such a truck in proximity to the public in Morro Bay.

Specific features have been incorporated in the design of the Project to keep potential impacts below a level of significance, as shown in the quantitative offsite consequence analysis (see Section 6.15.2.2.3). Alternative engineering design features that provide equivalent or superior protection against potential offsite impacts can also be used in final design and construction of aqueous ammonia storage and handling facilities.

---

(3) California Department of Food and Agriculture. *Fertilizing Material Tonnage Report*, 1996,1997,1998, 1999, 2000

(4) U.S. Department of Transportation. http://hazmat.dot.gov/spills.htm, August 31, 2000. The seven years (1993-1999) are the portion of the overall database (1971-1999) placed on the website.

Potentially significant impacts will be avoided because Duke Energy will continue to transport, use and dispose of hazardous materials in ways that prevent the release of these materials. Following the Cal-ARP Program requirement to analyze offsite consequences of a hypothetical worst-case accidental release, impacts are less than significant because project design features prevent offsite impacts from a potential accidental release.

An accidental release can only occur if hazardous materials are handled improperly or if a catastrophic event occurs. Although the probability of such events occurring is extremely low, passive design features have been included in the Project to reduce potential impacts to a level of insignificance. Hence, mitigation measures will not be required (see Section 6.15.3).

In the analysis of the offsite consequences of a hypothesized worst case accidental release, a significant impact would not occur if the toxic or flammable endpoint (i.e., Emergency Response Planning Guideline Level 2 [ERPG-2] concentration) is less than the distance to the nearest public receptor.

Potential offsite impacts are evaluated in terms of the ground-level concentrations of each hazardous material that qualifies as a state-regulated substance under the Cal-ARP Program or a federal regulated substance under Section 112(r) of the Clean Air Act. Aqueous ammonia is the only substance stored and used onsite that qualifies as a regulated substance (both programs), and requires an offsite consequence analysis and a RMP.

Concerning ammonia, the four following level of concern concentrations have been identified to characterize public health impacts associated with its hypothetical release:

- Lethal: The lethal concentration is 2,000 parts per million by volume (ppmv), averaged over 30 minutes.
- Immediately Dangerous to Life and Health (IDLH): The IDLH concentration is 300 ppmv, averaged over 30 minutes (National Institute of Occupational Safety and Health [NIOSH], 1997). This concentration was chosen by the NIOSH to protect the health of workers who could be potentially exposed to ammonia vapor in the course of their job. Concentrations above the IDLH pose the threat of death or immediate or delayed adverse health effects, or cause a condition that could prevent escape from the impacted environment.
- ERPG-2: The ERPG-2 concentration is 200 ppmv, averaged over 1 hour. It is defined as the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

- Short-Term Public Emergency Limit (STPEL): The STPEL is a concentration set by the National Research Council at 75 ppmv, averaged over 30 minutes. The California Energy Commission (Commission) uses this concentration as a guideline to assess potential acute health impacts due to ammonia exposures. Concentrations below 75 ppmv are believed to have no human health or environmental impacts, and hence, to be insignificant.

More specifically, the potential accidental release of ammonia offsite is considered to be insignificant if the STPEL concentration does not reach a public receptor.

6.15.2.1 Construction Impacts

During Project construction and demolition of existing facilities, hazardous materials stored onsite will be limited to paint, other coatings and adhesive materials, and emergency refueling containers. These materials will be stored in a locked utility shed or secured in a fenced area. It is anticipated that fuels, lubricants and other materials needed for operation of construction equipment will be transported to the construction site on an as-needed basis by contractors. There are no feasible alternative materials to use for construction activities.

Duke Energy and contractor personnel constructing the Project will be trained in handling hazardous materials and will be alerted to dangers associated with these materials. An onsite safety engineer will be designated to implement health and safety guidelines and contact emergency response personnel and the local hospital, if necessary. Material Safety Data Sheets for each onsite chemical will be kept onsite and construction employees will be aware of their location and content.

Construction and demolition contractors for the Project will be required to have or develop standard operating procedures for servicing and fueling construction equipment. These procedures will, at a minimum, include the following:

- No smoking, open flames, or welding will be allowed in fueling/service areas.
- Fueling, service and maintenance will be conducted only by trained personnel.
- Refueling will be conducted only with approved pumps, hoses and nozzles.
- Disconnected hoses will be handled in a manner to prevent residual fuel and liquids from being released into the environment.
- Catch-pans will be placed under equipment to catch potential spills during servicing.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents.

- Spills that occur during vehicle maintenance will be cleaned up immediately. Contaminated soil will be containerized and managed as a hazardous waste, if appropriate. A log of spills and cleanup actions will be maintained.
- Emergency phone numbers will be available onsite.
- Containers used to store hazardous materials will be properly labeled and kept in good condition.

It is anticipated that these standard operating procedures will reduce the potential for incidents involving hazardous materials during construction to a level of insignificance. No additional measures beyond those described in Section 6.15.2.1 (Construction Impacts) are needed to reduce potential impacts below a level of insignificance.

6.15.2.2 Operations Impacts

Hazardous materials will be used and stored onsite to support the operation of the new combined-cycle generating units. The maximum quantity of each hazardous material that will be stored or used for either an existing or proposed process is listed in Table 6.15-5, along with information on the use, location, nature of the hazard, and state/federal threshold quantities.

6.15.2.2.1 Fire and Explosion Risks

Natural gas and hydrogen, which are flammable, will continue to be used in the operation of the new combined-cycle units. An analysis of natural gas pipeline safety was conducted as part of an Application for Certification (AFC) prepared for the Sacramento Municipal Utility District (SMUD, 1993) and the certificate application to the Federal Energy Regulatory Commission for the Mojave Northward Expansion Project (Woodward-Clyde, 1994). Combined, these projects represented over 800 miles of new natural gas pipeline in California ranging in diameter from 8 inches to 40 inches. The routes proposed in both of these projects passed through areas with numerous residential units and other structures within 100 feet of the proposed pipeline. Conclusions in both of these studies indicated that the incremental individual fatality risk related to these pipelines was substantially lower than that for fires, earthquakes, electrocution and lightning strikes in California.

TABLE 6.15-5

PROPOSED PROJECT HAZARDOUS MATERIALS
MORRO BAY POWER PLANT

MATERIAL[1]	USE	LOCATION OF MAXIMUM QUANTITY	NATURE OF HAZARD	PROCESS-RELATED MAXIMUM QUANTITY (pounds)	RMP THRESHOLD[2] (pounds)	
					Cal-ARP	Federal
Acetylene	Welding	Compressed Gas Storage Area	Flammable	25	--	10,000
Aqueous Ammonia (29.4%)	SCR	Aqueous Ammonia Storage Facility (see Figure 6.15-3)	Corrosive/Toxic	224,910[3]	500	20,000[4]
Diesel Fuel	Vehicles, Diesel-Fueled Emergency Fire Pumps, and Safe Plant Shutdown Emergency Generator	Above-Ground Storage Tank	Flammable	28,162	--	--
Gasoline	Vehicle Fuel	Above-Ground Storage Tank	Flammable	5,741	--	--
Hydrazine (35 % by weight)	Boiler Feedwater Oxygen and pH Control	Hydrazine Storage Building	Toxic	347	1,000	15,000
Ethylene Glycol Solutions	Coolant for emergency engines	Lube Oil Storage		50	--	--
Hydrogen	Generator Cooling	Combined-Cycle Generators	Flammable	744[5]	--	10,000
1,1,1-Trichloroethane (1,1,1-TCA)	Solvent for Cleaning Parts	Lube Oil Storage Building	Toxic	600	--	--
Methylisobutylketone (MIBK)	Painting Solvent	Lube Oil Storage Building	Toxic	30	--	--
Light Petroleum Distillates	Solvent for Cleaning	Lube Oil Storage Building	Flammable/Toxic	312	--	--
Propane	Forklift Fuel	Compressed Gas Storage Area	Flammable/Toxic	49	--	10,000
Sodium Hypochlorite (12.5% weight)	Circulating Water Biofouling Control	Cooling Water Intake Structure	Corrosive	5,372	--	--
Hydrochloric acid (various concentrations	HRSG Boiler Cleaning	Tank Truck at HRSG Boiler	Corrosive/ Toxic	1,000[6]	--	15,000[7]
Ethylene diamine - tetra-acetic acid (EDTA)	HRSG Boiler Cleaning	Tank Truck at HRSG Boiler	Irritant	1,000[6]	--	--
Aromatic Hydrocarbon, butyl ether of ethylene glycol, and hexylene glycol	CTG Compressor Cleaning	Tank Truck at HRSG Boiler	Flammable/ Toxic	1,800	--	--
Ammonium Bifluoride[8]	Chemical Cleaning of HRSG	Tank Truck at HRSG Boiler	Corrosive	50[6]	--	--
Cyclohexylamine[8,9]	Boiler feedwater pH Control	Boiler Process - Chemical Storage Area	Toxic	265	10,000	15,000
Methyl Ethyl Ketone Oxime[8]	Feedwater Oxygen Control	Boiler Process - Chemical Storage Area	Toxic/Irritant	267	--	--
Monoethanolamine[8,9]	Boiler feedwater pH Control	Boiler Process - Chemical Storage Area	Toxic/Irritant	297	--	--
Morpholine[8,9]	Boiler feedwater pH Control	Boiler Process - Chemical Storage Area	Toxic	2,780	--	--

98-710/Rpts/AFC(text) (10/13/00/kh)

(1) Natural gas for the Project is discussed separately in Section 6.15.2.2.1.
(2) Threshold above which a Risk Management Plan (RMP) is required.
(3) Based on 30,000 gallons (administrative limit) in one storage tank.
(4) If concentration is equal to or greater than 20 percent.
(5) Conservatively based on the total amount of hydrogen delivered by, and stored in, a ten-tube trailer.
(6) Occasional use; not always stored onsite.
(7) If concentration is equal to or greater than 37 percent..
(8) These chemicals are commonly used as stated. Similar chemicals could be substituted, which do not cause significantly greater risks.
(9) When one of these materials is being used, the other is not.

Given that the existing natural gas pipeline will simply carry additional natural gas, the above conclusions are also applicable to the increased use of the existing natural gas pipeline. As a result, the potential impacts presented by the additional use of the natural gas pipeline are not significant.

The risk of a fire or explosion onsite will continue to be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. Additionally, start-up procedures will require air purging of gas turbines and fireboxes prior to start-up to preclude the presence of an explosive mixture.

Hydrogen will continue to be used as a generator coolant for the new combined-cycle units. A maximum of 744 pounds (lbs) of hydrogen will be stored or used in each onsite process, based on the conservative combination of the total content of a ten tube trailer used to deliver and store the gas. The trailer will be stored outside near the combustion turbine generators and away from potential ignition sources as required by applicable building and fire codes.

Hydrogen will not require an RMP because the maximum quantity stored or used in an onsite process will be less than the threshold of 10,000 lbs that would define it as a federal regulated substance. The potential impacts presented by the onsite hydrogen are not significant because the maximum process-related amount of 744 lbs is only approximately 7 percent of the threshold requiring further action (i.e., preparation of an RMP).

Other gases stored and used at the facility include those typically used for maintenance activities such as shop welding and emissions monitoring (e.g., acetylene, argon, carbon monoxide, nitric oxide, nitrogen and oxygen). The potential impacts presented by the use of these gases at the facility are not significant based on the following:

- The gases will continue to be stored in multiple standard-sized portable cylinders, in contrast to a single larger cylinder, generally limiting the quantity released from an individual cylinder failure to less than 200 standard cubic feet.
- The gases will continue to be stored in U.S. Department of Transportation (DOT)-approved safety cylinders, secured to prevent upset and physical damage.
- Incompatible gases (e.g., flammable gases and oxidizers) are stored separately.

6.15.2.2.2 Hazardous Materials Requiring Offsite Consequence Analysis

Aqueous ammonia will be the only hazardous substance present in sufficient quantity to be a State and Federal Regulated Substance subject to the requirements of the Cal-ARP program. Aqueous ammonia (29.4 percent solution) for the Project, stored in two 34,050-gallon (30,000-gallon administrative limit) aboveground storage tanks, will be used to reduce NO_x emissions from generating units.

6.15.2.2.3 Offsite Consequence Analysis

This section outlines the contents of an offsite consequence analysis, or evaluation of potential acute public health impacts from an accidental release of aqueous ammonia. Detailed calculations for this analysis are included in Appendix 6.15-1.

The offsite consequence analysis was performed for the following two hypothetical accidental release scenarios: "worst case," and alternative. An alternative scenario is included because it is at least conceivable, even if improbable, while the worst-case scenario is so unrealistic as to be almost impossible. The probability of the alternative scenario actually happening is extremely low. Distances to specified concentrations of ammonia were estimated for each scenario. If specified "level of concern" concentrations reach offsite, then potential public health impacts would be evaluated.

The offsite consequence analysis includes four components. The first is to describe the scenario, including passive features designed to minimize emissions, in enough detail to allow quantitative analysis. The second component of the offsite consequence analysis is to estimate emission rates associated with each scenario. The third component is to use atmospheric dispersion modeling to predict the distances to the levels of concern in each scenario. The fourth component assesses the potential degree and extent of offsite consequences of the concentrations computed by the dispersion modeling.

Section 6.15.2.2.4 describes the worst-case release scenario. Section 6.15.2.2.5 describes the alternative release scenario. Section 6.15.2.2.6 describes the estimation of emission rates and selection of meteorological parameters to be used as inputs to the modeling. Section 6.15.2.2.7 presents the atmospheric dispersion modeling methodology. Results are discussed in Section 6.15.2.2.8, including an exposure assessment for potential receptors in the Project area.

6.15.2.2.4 Worst-Case Release Scenario

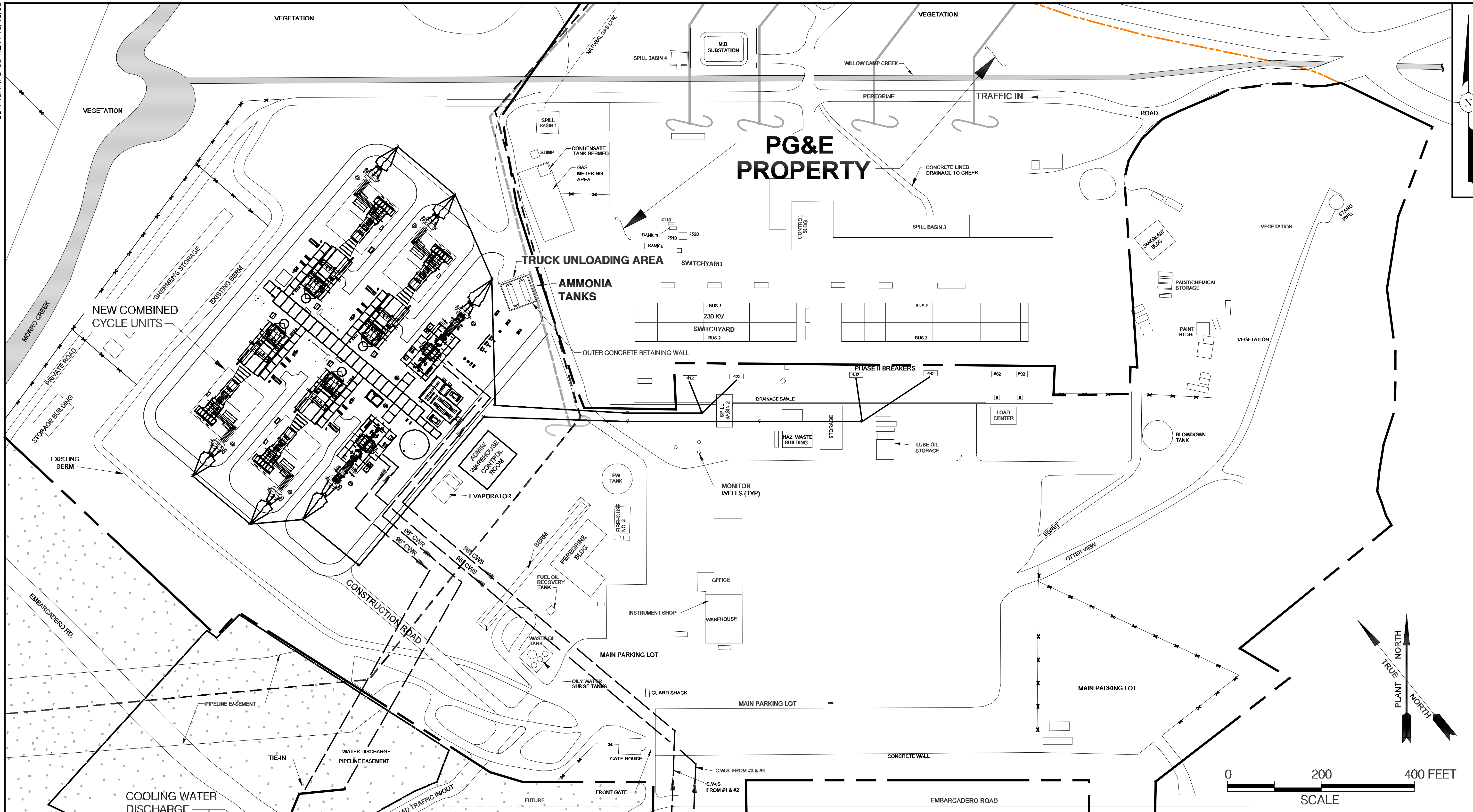
Potential accidental release scenarios due to aqueous ammonia handling and use include losses from a storage tank, losses during unloading of a tank truck to a storage tank, losses in the aqueous ammonia delivery system from the storage tank to the vaporizers, and losses of vaporized ammonia during delivery to the SCR catalyst beds used to control NO_x emissions.

Because of safety shut-off systems associated with delivery of aqueous ammonia from a storage tank to the vaporizer, and of ammonia vapor to the SCR, potential ammonia release quantities from these system components in the event of an upset condition are small compared to losses from a storage tank or from tank truck unloading.

The proposed location of the storage tanks and unloading facility is shown in Figure 6.15-3. The "worst case" is the hypothetical instantaneous release of a full storage tank, induced by some improbable catastrophic event. Regardless of the low probability of the "worst-case" rupture, one of the storage tanks is assumed to instantaneously release its full 30,000 gallons of aqueous ammonia into its containment, formed by a 3-foot-high wall around the perimeter of its 60-foot by 30-foot area (see Figure 6.15-4). This individual tank containment design serves as a passive control system to limit to 1,800 square feet (ft^2) the potential maximum area of volatilization of any accidental release of aqueous ammonia.

Because the area available for volatilization directly affects the emission rate, an innovative passive design feature was included to further reduce the emission rate and potential offsite consequences of an accidental release. Two layers of industrial-grade plastic (e.g., urethane, polystyrene) balls will be placed in the bottom of each of the two 1,800 ft^2 containment structures (see Figure 6.15-4). The balls will be approximately 1-1/2 to 3 inches in diameter. If aqueous ammonia were accidentally released from a storage tank, the liquid would pass between the balls and spread out on the concrete base. The floating balls would reduce the area available for volatilization to approximately one-tenth of the total surface area of liquid. The balls would also block the wind, greatly reducing the wind speed at the surface of the liquid, which is another parameter that affects the rate of volatilization. The analysis presented herein is conservative in not taking account of this reduction in wind speed, which cannot be calculated in any straight-forward way.

98-710RAFC-95 REV. 10/16/00

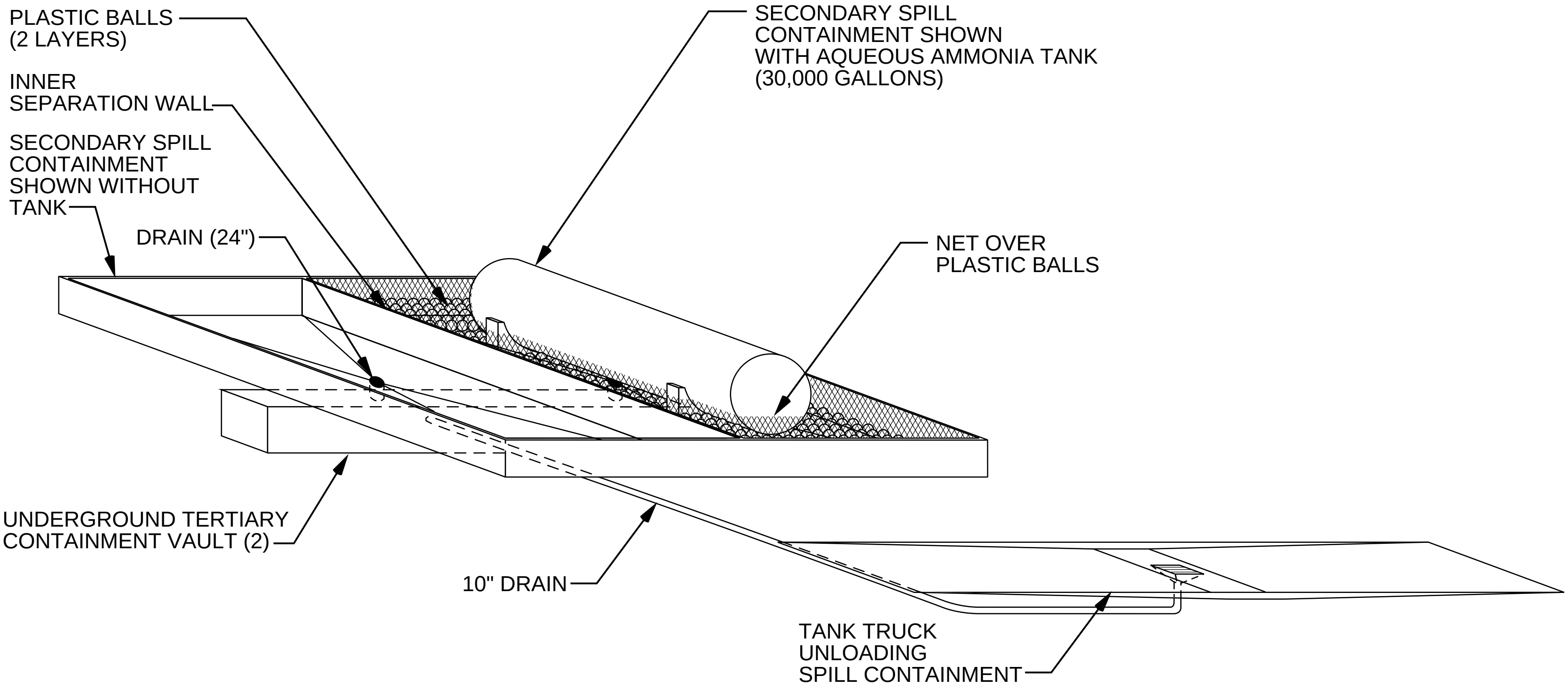


PROPOSED AQUEOUS AMMONIA UNLOADING AND STORAGE FACILITY LOCATIONS

DUKE ENERGY MORRO BAY LLC
MORRO BAY POWER PLANT

TRC

FIGURE 6.15-3



NOT TO SCALE

NOTES:

(1) OTHER DESIGNS WITH EQUIVALENT PROTECTION ARE ALSO ACCEPTABLE.

(2) ONE POSSIBLE DESIGN WOULD BE A CONCRETE UNDERGROUND TERTIARY CONTAINMENT VAULT SIZED TO HOLD 53,860 GALLONS, WHICH EXCEEDS THE REGULATORY REQUIREMENT (CCR 22, SECTION 66264.193) TO HOLD THE MAXIMUM CONTENTS OF 1 AQUEOUS AMMONIA STORAGE TANK (30,000 GALLONS) PLUS A 24-HOUR 25-YEAR PRECIPITATION EVENT (5.42 INCHES).

AQUEOUS AMMONIA STORAGE DESIGN FEATURES(1)

DUKE ENERGY MORRO BAY LLC
MORRO BAY POWER PLANT

TRC

FIGURE 6.15-4

Another passive design feature is included to reduce the length of time ammonia could volatilize from the liquid while it remained pooled in the secondary surface containment area. The bottom of each containment is sloped towards the center, at which a 24-inch-diameter manhole-sized drain drops directly into an underground tertiary containment vault (see Figure 6.15-4). The same vault, is also connected by a 10-inch pipe to a drain in the center of the ramped containment of the tank truck unloading facility. The vault will be able to contain 53,860 gallons, which exceeds the 47,300 gallon volume made up of the 30,000 gallons aqueous ammonia in one storage tank plus the volume of rainwater potentially collected from the 24-hour, 25-year storm, as required by CCR Title 22, Section 66264.193. A 1-inch square wire mesh screen is placed on top of each manhole drain to prevent the balls from falling through.

6.15.2.2.5 Alternative Release Scenario

The alternative scenario is loss of aqueous ammonia during unloading of a tank truck. A connector in the unloading piping is assumed to come apart and the aqueous ammonia flows out freely through the 3-inch piping under the pressure head determined by the height of the liquid in the tank truck relative to the height of the coupling. The 8,000 gallons in the tank truck are conservatively assumed to flow out into an area 21 feet long (i.e., half the length of the truck's tank) by 16 feet wide, which is limited by the concrete side walls along the unloading ramp (see Figure 6.15-4). The aqueous ammonia flows down the sloping base of the concrete ramp to a centrally located 10-inch-diameter drain connected to the vault.

In this alternative scenario, the rate at which the aqueous ammonia escapes from the tank truck is determined by the 3-inch size of the piping used for unloading. The liquid drains out of the 3-inch coupling, falls on the concrete ramp and is conservatively assumed to flow in a 16-foot-wide band down the ramp to empty into the 10-inch-diameter drain. The liquid does not accumulate to cover more of the ramp area because the area of the drain is over 11 times larger than that of the leaking coupling. Also, administrative controls (e.g., instructions), physical indicators (e.g., truck position beepers), and physical constraints (e.g., unloading flexible pipe length) will assure that the unloading connector is no further than 21 feet from the drain in the center of the ramp.

6.15.2.2.6 Emission Rate and Meteorological Conditions

The fundamental equation for the emission rate of ammonia vapor from an aqueous solution is given by the following[5]:

$$E = \frac{0.284U^{0.78}M^{2/3}AP}{82.05T} \qquad \text{(Equation 1)}$$

where E = emission rate of ammonia [MT^{-1}][6] (lbs per minute [$min]^{-1}$)[7]

U = wind speed [LT^{-1}] (meters per second)

M = molecular weight of ammonia [M $mole^{-1}$] (grams per gram-mole)

A = surface area of spilled liquid pool [L^2] (ft^2)

P = vapor pressure of ammonia above liquid [ML^{-1} T^{-2}] (millimeters [mm] Hg)

T = temperature of liquid [Ø] (°Kelvin, K)

The wind speed used in the equation is taken from measurements made at the standard height of 10 meters (33 ft). This wind speed is higher than that closer to the surface of the liquid, and hence, conservatively results in a higher emission rate.

The temperature of the liquid is assumed to be the same as the air temperature. This assumption is conservative because the maximum air temperature used in "worst-case" meteorological conditions occurred only once during the 3-yearperiod 1996 through 1998, and then only momentarily.

The temperature and other meteorological conditions that are used in modeling the two release scenarios are shown in Table 6.15-6. The "worst case" temperature was 97 degrees Fahrenheit (° F), which occurred briefly on October 6, 1996. Atmospheric stability is another important meteorological parameter used in modeling the dispersion of the ammonia that vaporizes from the liquid. The "worst case" stability (i.e., most stable) classification is F, for which the atmosphere has the least mixing, and hence, the ammonia concentration would remain highest as the vapor is carried downwind.

The combination of the maximum observed temperature and maximum stability is so conservative as to not actually occur. Maximum temperature occurs during the afternoon when the air is unstable (e.g., Classification B for the maximum temperature of 90.9° F observed at 3:00 p.m.

(5) United States Environmental Protection Agency (EPA). Risk Management Program Guidance for Offsite Consequence Analysis, April 15, 1999.

(6) Brackets [ ] give dimensions of the variable, in which M = mass, T = time, L = length and Ø = temperature.

(7) Parentheses ( ) give example units for the variable.

TABLE 6.15-6

ACCIDENTAL RELEASE SCENARIOS
MORRO BAY POWER PLANT

SCENARIO	METEOROLOGICAL PARAMETER	UNITS	RELEASE SCENARIO	
			STORAGE TANK(1)	TANK TRUCK UNLOADING(2)
WORST-CASE (Cal-ARP)	Stability	None	F	--
	Wind Speed	Meters per second	1.5	--
	Temperature(3)	Degrees Fahrenheit	97	--
	Relative Humidity(4)	Percent	77	--
ALTERNATIVE	Stability(5)	None	--	D
	Wind Speed(5)	Meters per second	--	2.8
	Temperature(5)	Degrees Fahrenheit	--	58
	Relative Humidity(4)	Percent	--	77

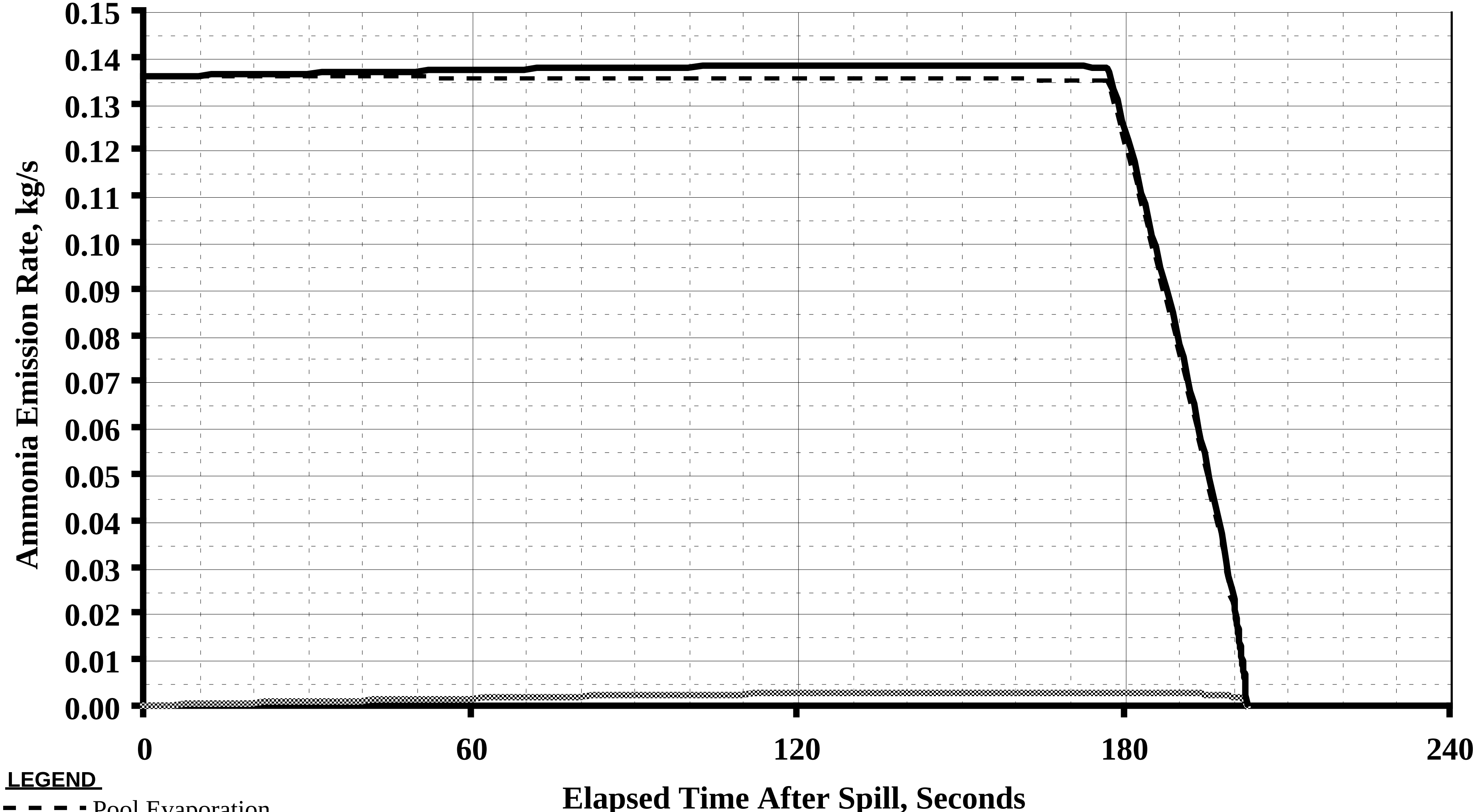
98-710/Rpts/AFC(Text)/Tbls&Figs/Sect. 6 (8/17/99/rm)

(1) The storage tank scenario is the extremely low probability "worst-case," and hence, is run with independently-selected worst-case meteorological conditions as required by Cal-ARP (i.e., this set of conditions cannot occur simultaneously).
(2) The alternative scenario is also extremely low probability, but is a more probable type of release, and hence, is run with average meteorological conditions.
(3) Temperature is highest observation during 1996-1998.
(4) The relative humidity is the average as required by the Cal-ARP Program.
(5) Arithmetic means calculated from 1997 hourly data.

on October 14, 1997). In contrast, F stability occurs during nighttime or early morning before sunrise. The maximum temperature observed during F stability in 1997, for example, was only 75.6° F.

The low wind speed of 1.5 meters per second (m/sec) is a Cal-ARP requirement. Low wind speed results in a low volatilization rate as can be seen in Equation 1, but also results in reduced dispersion of the vapor as it is carried downwind.

Evaporation rate for the "worst-case" scenario (see Figure 6.15-5) is calculated iteratively over 1 to 10 second steps. The rate is constant while the aqueous ammonia pool is dropping in height as it drains down into the vault. The rate decreases when the top of the liquid moves down the



LEGEND

Pool Evaporation

Displaced Air through Drains

Total

RELEASE CONDITIONS

INSTANTANEOUS SPILL OF 30,000 GALLONS 29.4% AQUEOUS AMMONIA INTO 1 SLOPING SUMP, 1 LAYER CLOSE-PACKED PLASTIC BALLS, 24" WITH GRATING, 75% OPEN

WORST-CASE ACCIDENTAL RELEASE EVAPORATION RATE OF AMMONIA

DUKE ENERGY MORRO BAY LLC
MORRO BAY POWER PLANT

TRC

FIGURE 6.15-5

sloping bottom surface, causing the area to decrease. The emission rate becomes negligible when the liquid drains out completely. After that, the area of volatilization for the aqueous ammonia from the underground tertiary containment vault is only the area of the two 24-inch drains as reduced by the balls and underlying screen, and one 10-inch drain.

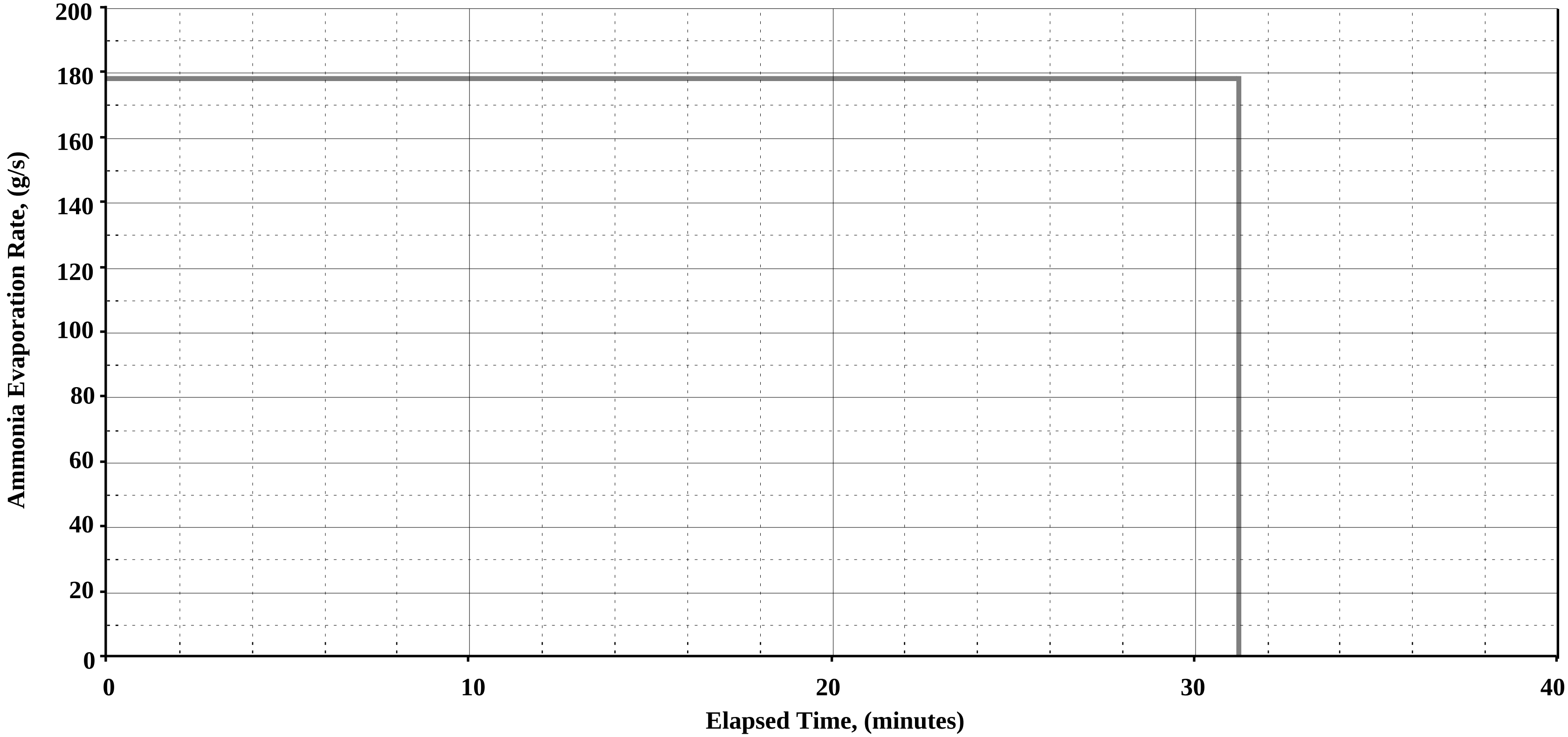
A conservative simplification of the time-dependent emission rate of ammonia for the alternative release scenario is shown in Figure 6.15-6. The initial emission rate of 179.2 grams per second (g/sec) is the maximum because the height of the liquid, which produces the driving force, or head, is highest. This liquid spill rate is held constant at its maximum for the full time period (1,894 sec) it takes for the 8,000 gallons to leak out of the truck. In reality, as the aqueous ammonia flows out of the 3-inch disconnected coupling, the level in the tank truck drops continuously. The resulting drop in pressure head decreases the liquid leak rate and the area of sloping surface covered by liquid and hence, available for volatizing ammonia. The volatilization rate out of the 10-inch-diameter drain to the underground secondary containment vault is negligible.

6.15.2.2.7 Modeling Methodology

DEGADIS is the model used to simulate atmospheric dispersion of ammonia vapor. This EPA-approved model computes concentrations at various distances from inputs of time-dependent emission rate and constant meteorological conditions (e.g., 97° F, 1.5 m/sec wind speed, and F stability). The model is adjusted for the neutrally-buoyant ammonia vapor.

DEGADIS is an iterative (time-stepping) model, that can accept time-dependent emission rates such as calculated for the two accidental release scenarios (see Figures 6.15-5 and 6.15-6).
The model assumes that the low wind speed blows in any one direction during the period of volatilization, so that the resulting distances to specified concentrations are represented as circles around the emission "point" (e.g., ammonia storage and unloading area). Distances are computed to the four "level of concern" concentrations used as public health thresholds.

The detailed modeling is presented in Appendix 6.15-1, while the results are summarized in the next section.



RELEASE CONDITIONS

LEAK OF 8,000 GALLONS FROM
TANK TRUCK THROUGH 3-INCH COUPLING
INTO CONCRETE CONTAINMENT HAVING
10-INCH DRAIN

ALTERNATIVE ACCIDENTAL RELEASE: AMMONIA EVAPORATION RATE

DUKE ENERGY MORRO BAY LLC
MORRO BAY POWER PLANT

TRC

FIGURE 6.15-6

6.15.2.2.8 Modeling Results

Figures 6.15-7 and 6.15-8 show the distances to the four level-of-concern concentrations for the "worst-case" and alternative scenarios, respectively (the scale on these figures is 1:24,000 as required by CEC "Appendix B" guidelines). The ERPG-2 concentration of 200 ppmv and the STPEL concentration of 75 ppmv both remain on the combined industrial site (i.e., Duke Energy and Pacific Gas and Electric Company [PG&E]) in both scenarios, assuring that the STPEL concentration of 75 ppmv does not reach a residence in either scenario. Sensitive receptors and emergency response facilities are not located within the area potentially affected by these releases, and hence, do not show in Figures 6.15-7 and 6.15-8.

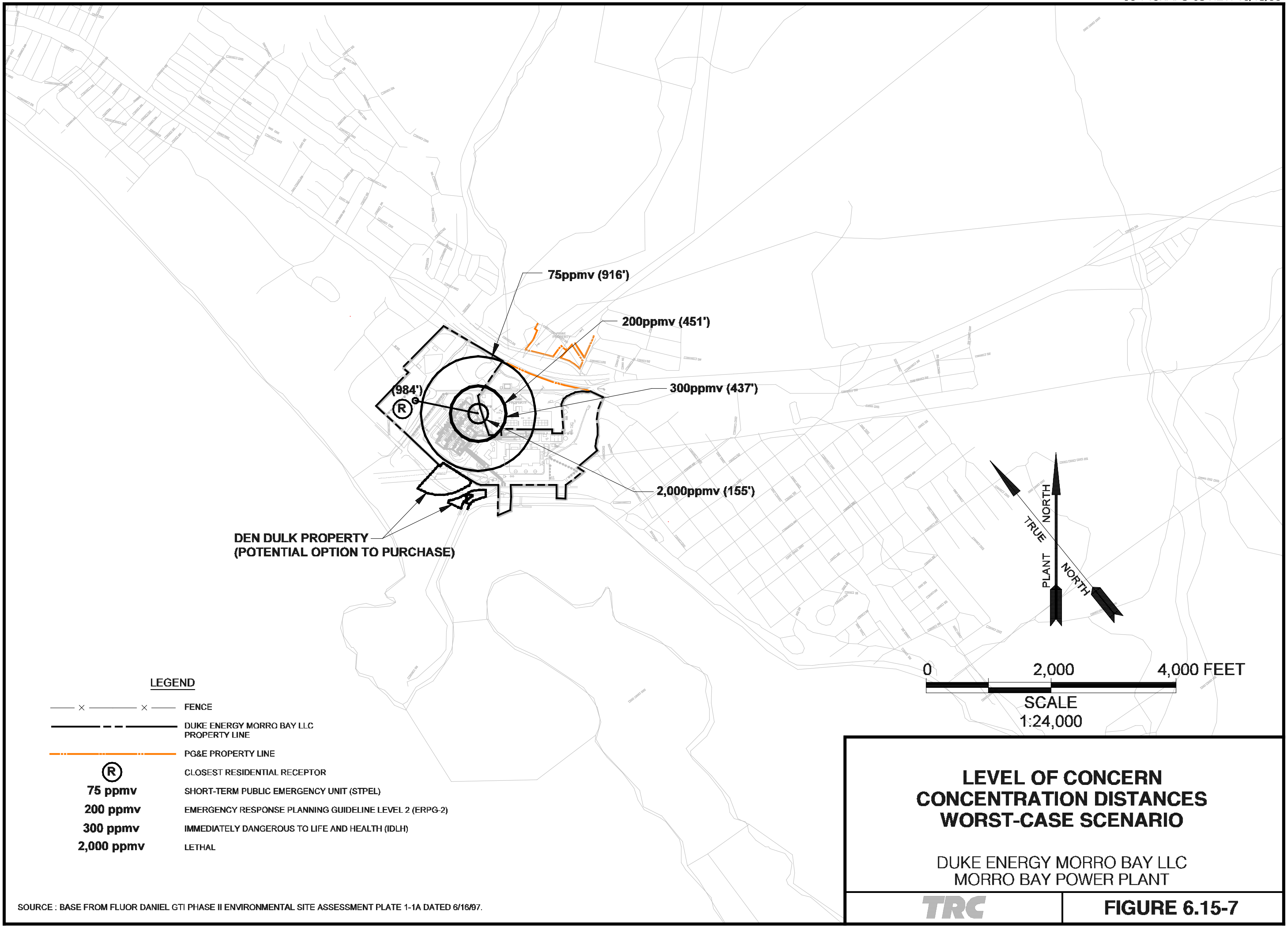
The application of several passive design features incorporated into the Project successfully keeps the distances to STPEL concentrations shorter than the closest residence. Therefore, the potential impacts of these hypothesized accidental release scenarios have been controlled to a level of insignificance.

MBPP will be eligible for Cal-ARP Program 1 because it meets the following requirements:

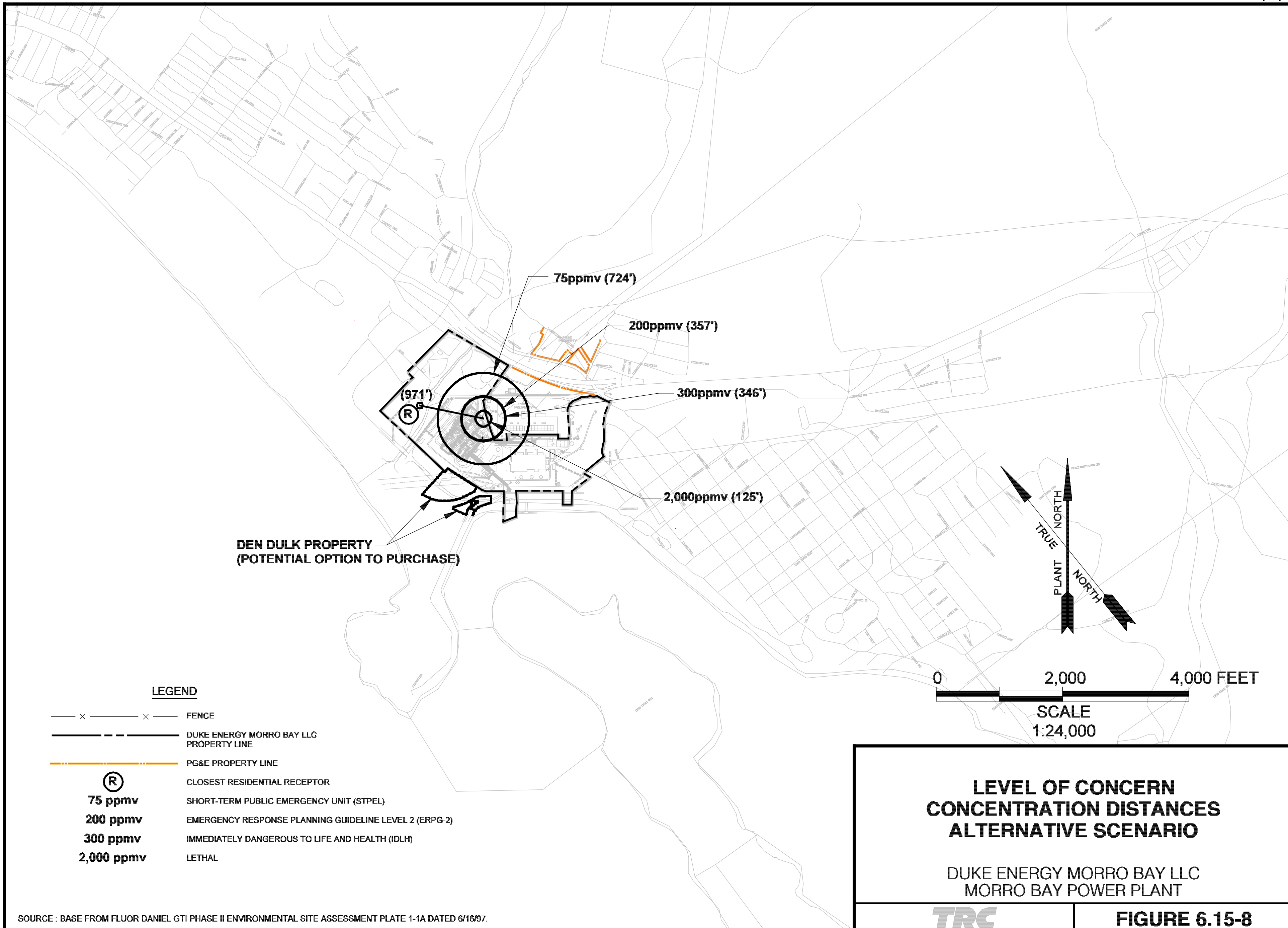
- "The distance to a toxic endpoint or flammable endpoint for a worst-case release is less than the distance to any public receptor." The toxic endpoint (i.e., ERPG-2 concentration) is 200 ppmv or 0.14 milligrams of ammonia per liter of air (mg/L).
- "For the 5 years prior to the submission of an RMP, the process has not had an accidental release of a regulated substance where exposure to the substance, its reaction products, overpressure generated by an explosion involving the substance, or radiant heat generated by a fire involving the substance has led to any of the following offsite consequences:
    - Death,
    - Injury, or
    - Response or restoration activities for an exposure of an environmental receptor."
- "Emergency response procedures have been coordinated between the stationary source and local emergency planning and response organizations."

In summary, no significant offsite consequences at receptors of public health concern are expected to occur from the worst-case or alternative release scenarios because Project design features sufficiently reduce the likelihood and consequences of such releases. As discussed in Section 6.17 - Worker Safety, workers at MBPP are trained to avoid and respond to accidental releases of hazardous materials, including ammonia. The Project design and worker training reduce the safety hazard due to an accidental ammonia release to an acceptable level.

98-710RAFC-83 REV. 10/13/00



98-710RAFC-82 REV.10/13/00



SOURCE : BASE FROM FLUOR DANIEL GTI PHASE II ENVIRONMENTAL SITE ASSESSMENT PLATE 1-1A DATED 6/16/97.

LEVEL OF CONCERN CONCENTRATION DISTANCES ALTERNATIVE SCENARIO

DUKE ENERGY MORRO BAY LLC
MORRO BAY POWER PLANT

TRC

FIGURE 6.15-8

6.15.2.2.9 Impacts of Other Hazardous Materials

Tables 6.15-3 and 6.15-4 listed the petroleum-containing hazardous materials associated with the current operation of Units 1 through 4. The combined-cycle units will require additional quantities of petroleum-containing hazardous materials as listed in Table 6.15-7.

TABLE 6.15-7

PETROLEUM-CONTAINING HAZARDOUS MATERIALS MORRO BAY POWER PLANT MODERNIZATION

PETROLEUM-CONTAINING HAZARDOUS MATERIAL	QUANTITY PER UNIT(1) (gallons)
Gas Turbine Lube Oil	12,000
Steam Turbine Lube Oil	6,000
Steam Turbine Hydraulic Fluid	135
Main Electrical Transformer Oil	45,000
Auxiliary Electrical Transformer Oil	10,000
Miscellaneous Plant Equipment Lube Oil • Gas Compressors • Air Compressors • BFW Pumps	675

98-710/Rpts/AFC(Text) (8/29/00/ks)

(1) The Project will be the construction and operation of two identical combined-cycle units.

The potential for spillage of the existing and additional petroleum-containing hazardous materials will continue to be insignificant because of the following preventive measures:

- These materials are delivered and stored in containers, approved by the DOT, which are capable of resisting impacts that may potentially occur during transport and handling (e.g., steel 55-gallon drums).
- These materials are stored and used within containment areas that only drain inwards to internal drains connected to the existing oil-water separator system.
- Oil reservoir levels are checked frequently. If a level changed significantly, corrective action would be triggered immediately.
- Oil reservoirs have high- and low-level sensors, and alarms, which annunciate in the continuously-manned main control room. The sensors, alarms, and associated instrumentation are calibrated annually.

- The oil-water separator is checked daily for abnormal operating conditions. Each pump that transfers water through the separator has a full-duty permanently installed backup pump. The oil-water separator area is covered with asphalt or concrete and fully contained to prevent spills from escaping.
- Small pumps and engines have pans to contain drips from leaking gaskets.

The comprehensive response plans for existing petroleum-containing hazardous materials, as described in the Spill Prevention, Control and Countermeasure (SPCC) Plan (TRC, 1998), will continue to be fully applicable to the additional materials associated with the Project. Details within the SPCC Plan will be modified**,** as appropriate, to describe the exact location of the new pieces of equipment that contain these materials (e.g., turbines and transformers).

The adequacy of the prevention measures used in the past is documented in the SPCC Plan, namely, a spill-free history for at least the previous five years. More specifically, the information on design and operation of petroleum-containing equipment is contained in Part II of the SPCC Plan, and is included in this response as Appendix 6.15-2.

Sections 6.15.2.2.3 through 6.15.2.2.5 discussed the design features for the storage and handling of aqueous ammonia that assure potential impacts on the environment, including coastal resources, will be less than significant. For hazardous materials other than aqueous ammonia and petroleum-containing substances, the two basic approaches that will continue to prevent spills into the coastal environment are comprehensive containment and worker safety programs.

Comprehensive containment means that each hazardous material is stored and used in areas having appropriate containment against loss of the material offsite in the event of a spill. Tanks, walls, dikes, berms, curbs and similar devices are used to accomplish effective containment. The worker safety programs described in Section 6.17 - Worker Safety assure that hazardous substances do not escape to threaten employees nor escape offsite to affect the coastal environment. Briefly, these programs include the following elements:

- Safety Action Plan for Contractors
- Hazard Control Program
- Plant Safety Committee
- Injury and Illness Prevention Program
- Code of Safe Work Practices
- Safety training and meetings
- Safety inspections
- Job safety analysis

- Safety incentive program
- Accident and “near miss” investigations
- Training in the handling of hazardous materials
- Step by step procedures required for fueling delivery and handling

Each of these programs and elements are described in Section 6.17 - Worker Safety and continue to be implemented by plant personnel, assuring both worker safety and the prevention of offsite loss of hazardous materials.

No environmental impacts are anticipated from use of other hazardous materials at the facility. Only small quantities of paints, oils, solvent, pesticides and cleaners, typical of those packaged for retail consumer use, will be present during operation of the facility. Small volumes of petroleum products associated with construction equipment will be onsite during construction. These materials have low acute toxicity. Long-term or cumulative impacts will be avoided by cleaning up any accidental spills of these materials as soon as they occur.

6.15.2.2.10 General Operating Practices

Each hazardous material will be stored in facilities appropriately designed for its individual characteristics. Bulk chemicals will be stored outdoors in aboveground storage tanks. Other chemicals will be stored in their original delivery containers. Hazardous chemical storage areas will be surrounded by curbs or dikes to contain the chemicals in the event of leaks or spills. Tanks containing hazardous chemicals will have secondary containment capable of holding at least the following:

- 110 percent of the tank volume if the containment is protected from precipitation, or,
- Precipitation from a 24-hour, 25-year storm event plus the greater of 100 percent of the capacity of the largest tank within its boundary, or 10 percent of the aggregate capacity of all tanks within its boundary.

Hazardous materials will be handled in accordance with appropriate regulations and codes. Incompatible materials will be stored separately.

Personal protection equipment will be provided for personnel unloading chemicals. Personnel working with chemicals will be trained in proper handling technique and in emergency response procedures to chemical spills or accidental releases.

Several programs at MBPP already address hazardous materials storage locations, emergency response procedures, employee training requirements, hazard recognition, fire control procedures, hazard communications training, personal protection equipment training, and release reporting requirements. These programs address chemical risk management in accordance with Cal-ARP regulations, Hazardous Materials Business Plan, worker safety program, fire response program, plant safety program and facility standard operating procedures.

The SCR system will include instrumentation that controls the injection rate of ammonia for NO_x control. The aqueous ammonia storage and handling facilities will be equipped with protective equipment such as continuous tank level monitors, temperature and pressure monitors and alarms, excess flow and emergency isolation valves, and a concrete containment structure surrounding the tank and piping. System maintenance and repairs will be conducted only by trained technicians.

6.15.2.2.11 Spill Response Procedures

A comprehensive SPCC Plan (TRC, 1998b) provides spill response procedures and all the other information needed to keep the potential impacts of a hypothetical oil spill less than significant. The tables of contents of the SPCC Plan is provided in Table 6.15-8. The Facility Emergency Response Plan contains detailed spill (or release) response procedures for oil-based liquids, asbestos, acids, bases, hydrazine, flammable gases, pond wastes, boiler cleaning chemicals, EDTA, metallic mercury, and PCBs.

In the event of a spill, release or threatened release involving a hazardous material, the event will be reported immediately to the facility Emergency Coordinator, who will immediately go to the scene of the emergency to assess the situation. The plant emergency response team and other key personnel on the emergency contact list in Volume II of the Business Plan/Contingency Plan (Duke Engineering, 2000) will also be notified. The Emergency Coordinator will determine if the spill, release or threatened release is reportable to regulatory agencies.

TABLE 6.15-8

TABLE OF CONTENTS
SPILL PREVENTION CONTROL
AND COUNTERMEASURES (SPCC) PLAN
MORRO BAY POWER PLANT

Any release or threatened release of hazardous material that may pose a significant present or potential hazard to human health and safety, the environment or property, will be immediately reported verbally to: the San Luis Obispo County Department of Environmental Health ([805] 781-5544) and the California Office of Emergency Services ([800] 852-7550 or [916] 262-1621). Immediate reporting will occur as soon as possible following knowledge of such a release, without impeding necessary immediate controls or emergency measures. Immediate reporting will include at least the following information in accordance with CCR Title 19, Section 2703 and CCR Title 22, Section 66256.56(b)(2):

- Name and telephone number of the reporter.
- Name and address of the facility.
- Time and type of incident (e.g., release, fire).
- Name and quantity of material(s) involved, to the extent known.
- Extent of injuries, if any.
- Possible hazards to human health or the environment outside of the facility.
- Whether or not agency assistance is required.

Certain types of releases in excess of Reportable Quantities specified in Title 40 CFR 302.4 and 355, and releases to navigable waters, may require additional reporting to the U.S. Coast Guard, National Response Center, the Regional Water Quality Control Board, or other agencies. MBPP will comply with these reporting requirements, as applicable.

Immediate reporting will be performed by the Emergency Coordinator or designee. The Emergency Coordinator or designee will determine the need for outside assistance and contact appropriate other response organizations (e.g., medical providers, ambulance service, police), as necessary.

6.15.2.3 Cumulative Impacts

The offsite consequence analysis described in Section 6.15.2.2 covers the Project. Concerning projects offsite, hypothesized accidental releases not only have a very low probability of occurrence, but the joint probability of more than one facility in close proximity experiencing an accidental release is even lower. Other projects in Morro Bay that have been evaluated for potential cumulative impacts are listed in Table 6.1-1. These projects do not have the potential to release hazardous materials in the same locale as the MBPP, and hence, cannot contribute cumulative hazardous material activities.

The analysis of the worst-case scenario for the Project does not show a distance to even the 75 ppmv STPEL that reaches other property where hazardous materials exist. Hence, no direction exists in which the worst-case scenario wind could cause offsite concentrations of ammonia from the Project to cumulatively add to potential offsite concentrations of any hazardous substance that might be possibly released by other activities in the City of Morro Bay.

6.15.2.4 Project Design Features

The following are design and operational features that have been incorporated in the Project to avoid potentially significant environmental impacts:

- Passive secondary containment structures that surround each aqueous ammonia storage tank and the tank truck unloading facility, limiting the area of potential spread of an accidental release.
- Underground tertiary containment vault that would collect an accidental release, reducing its ability to vaporize into the atmosphere.
- Large 24-inch (manhole-size) drain at the bottom center of the sloped secondary containment beneath each storage tank, combined with direct entry into the vault to reduce the time available for ammonia to volatilize from an exposed pool of liquid.
- Use of plastic balls to reduce ammonia evaporation from an exposed liquid surface, or out of the underground tertiary containment vault.

6.15.3 MITIGATION MEASURES

Based on the above analysis of impacts and the design and operational features that have been incorporated into the Project, no mitigation measures are required. Hence, no mitigation monitoring plan is required.

6.15.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

No significant unavoidable adverse impacts are anticipated from the Project.

6.15.5 LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS) COMPLIANCE

A summary of LORS related to hazardous material handling is provided in Table 6.15-9 and in Section 7.5.15. Concerning aqueous ammonia, the Project will be in compliance with applicable

TABLE 6.15-9

SUMMARY OF LORS AND COMPLIANCE APPLICABLE TO HAZARDOUS MATERIALS HANDLING MORRO BAY POWER PLANT MODERNIZATION PROJECT

JURISDICTION	LORS/AUTHORITY	ADMINISTERING AGENCY	REQUIREMENTS/ COMPLIANCE	APPROACH TO COMPLIANCE
Federal	29 USC 651 29 CFR §1910 et seq. 29 CFR §1926 et. seq.	OSHA; Cal-OSHA.	Describes equipment used to store and handle hazardous materials necessary to protect workers.	
	CAA, Sec. 112(r)	EPA; California Office of Emergency Services; San Luis Obispo County Environmental Health Department.	Preparation of Risk Management Plan (RMP) for hazardous materials stored or used onsite.	Design features allow MBPP to qualify for Program 1.
	49 CFR, Parts 172, 173	U.S. Department of Transportation; California Highway Patrol.	Meet standards for labels, placards, and markings on hazardous materials shipments. Hazardous materials communications. Emergency response.	Hazardous materials containers and shipping vehicles will continue to be labeled according to regulations. Employees will continue to be trained in hazardous materials communication and emergency response.
State	8 CCR §339	California Energy Commission.	Defines substances that are hazardous.	Consistent use of "hazardous" definition.
	8 CCR §5139 et seq. (Article 107)	California Energy Commission.	Sets up minimum standards to control hazardous materials and protect employees.	The MBPP meets or exceeds these standards in handling hazardous materials.
	8 CCR 5160 et seq. (Article 109)	California Energy Commission.	Sets up minimum standards to control hazardous materials and protect employees.	The MBPP meets or exceeds these standards in handling hazardous materials.
Local	City of Morro Bay Zoning Ordinance. Section 17.52.100.	City of Morro Bay.	Store or use hazardous materials no closer than 100 feet to residences.	Locations of hazardous materials are > 100 feet from residences.

98-710/Rpts/AFC(text) (9/27/00/jb)

LORS during construction and operation because the following will be accomplished before storage or use of aqueous ammonia for the Project:

- Workers handling aqueous ammonia for the Project will be thoroughly trained.
- The RMP will be prepared by DFDCO.
- The RMP will be approved by the San Luis Obispo County Department of Health.
- Emergency response procedures will be coordinated between facility personnel and local emergency planning and response organizations.

6.15.6 REFERENCES

Carnot. *Assessment of Health Risks Associated with Fuel Oil Utilization and Critique of Assembly Bill (AB) 2588 Risk Assessment for MBPP*. February 1994.

Duke Engineering and Services, Inc. (Duke Engineering). *Facility Emergency Response Plan, Volume II of Business Plan/Contingency Plan, Morro Bay Power Plant*. March 2000.

Environmental Science and Engineering, Inc. *Storm Water Pollution Prevention Plan. Pacific Gas and Electric Company, Morro Bay Power Plant.* December 1996.

National Institute of Occupational Safety and Health (NIOSH). *NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140*. U.S. Government Printing Office. Washington, D.C. 1997.

Sacramento Municipal Utility District (SMUD). *Proposed SMUD Cogeneration Pipeline Project, Application for Certification Supplement.* Prepared for the California Energy Commission. Docket No. 92-AFC-2P. April 1993.

TRC. *Business Plan/Contingency Plan, Morro Bay Power Plant*. Volume I, Plan Administration and Hazardous Material Inventories. June 1998a.

TRC. *Spill Prevention Control and Countermeasure (SPCC) Plan, Morro Bay Power Plant,* June 1998b.

Woodward-Clyde Consultants. *Safety and Reliability Analysis, Mojave Northward Expansion Project, Application for Certificate of Public Convenience and Necessity*. Response to data request, submitted to the Federal Energy Regulatory Commission in April 1994. 1994.

Wray, Thomas K. *"HazMat Chemist: Ammonia."* HazMat World, p. 86. November, 1991.